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Prospects for Commercialisation of an Alaska Native Wild Resource as a Commodity Crop

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Abstract

The emerging research evidence regarding functional food health benefits, coupled with the modern rise in degenerative and lifestyle-related health conditions, has created a growing market in the United States: the super-fruit. Wild berries, which contain bioactive phytochemicals with demonstrated efficacy against metabolic syndrome, have fulfilled important nutritional, medicinal, and social roles in Native American/Alaska Native lifestyles for generations. In this article, a SWOT analysis was used to explore the opportunities and obstacles for native development of wild Alaskan berries as a commercial product. On one hand, the novelty, market appeal and abundance of these phytochemically enriched berries suggest an entrepreneurial prospect for native communities. On the other hand, historical traditions typically dictate community ownership of the wild indigenous berries, and a natural inclination to protect common resources is prevalent in most communities. The factors that influence this complex juxtaposition between internal culture and external development are highlighted.

Keywords

Alaska Native, berry, super-fruit, CDFI, commercialisation, SWO

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Alaska's unique environment, largely undeveloped wilderness, harbours multiple species of wild berry that are fundamental to the traditional ecological knowledge (TEK) of Native American/Alaska Native (NA/AN) tribes. These indigenous berries, including bog blueberries and blue huckleberries (*Vaccinium uliginosum* and *V. ovalifolium*, respectively), salmonberries (*Rubus spectabilis* and *R. chamaemorus*, also known as cloudberrries) and mossberries (*Empetrum nigrum*, also known as crowberries and blackberries), are species largely unknown to consumers in the lower 48 states. NA/AN communities harvest the berries as a wild subsistence food, and value them for multiple medicinal properties, including the ability to counteract kidney trouble (Viereck, 2007), promote wound healing, aid gynaecological problems and treat diarrhoea (Heller, 1953; Moerman, 1998).

This northern American landscape is defined by its extremes: wide temperature fluctuations, short but intense growing seasons, near-24-hour summer photoperiod duration, and the presence of a permafrost soil structure (Alaska Department of Commerce, 2009). Endemic flora, and berry species in particular, evolve numerous physical, ecological and biochemical methods to ensure survival against biotic and abiotic stresses (Bliss, 1960; Chapin et al., 1987), including the accumulation of protective phenolic phytochemicals (anthocyanins, proanthocyanidins, etc.) that can be more highly expressed as the environment grows more hostile (Boyko & Kovalchuk, 2008; Grant-Downton & Dickinson, 2005; Satoe et al., 2001). Phenolic compounds not only help protect the berry species in the face of environmental adversity, but also act as powerful antioxidants capable of offsetting multiple human health concerns, including cardiovascular disease, DNA oxidative damage, neurodegeneration, multiple stages of carcinogenesis, bacterial infections and metabolic syndrome such as Type 2 diabetes and obesity (as reviewed by Szajdek & Borowska, 2008). The established link between the austere Alaskan climate and the enhanced accumulation of novel health-protective wild berry constituents (Kellogg et al., 2010) may represent a novel opportunity for development of Alaskan berries as a potential new commodity for distribution to the broader functional foods segment of American consumers.

Economic development is a pressing issue for many North American indigenous tribes (Duffy & Stubben, 1998). Despite fluctuating levels of government support throughout the twentieth century, the socio-economic

status of the indigenous people has stagnated (Vinje, 1996), culminating in a state of chronic economic underdevelopment. Poverty rates in NA/AN communities are approaching 34 per cent (compared with 12.3 per cent poverty rate overall in the United States) (Glasmeier, 2006; USDA, 2004). Many Alaska Native communities continue to rely on government transfer payments, which are dependent on state revenue sources; as Alaska derives up to 85 per cent of its revenue from oil production, this is an unsustainable situation (Berman et al., 1992). High rates of poverty and unemployment have exacerbated social problems, including domestic violence, alcoholism and substance abuse, health issues and depression (Bohn, 2003; Indian Health Services, 2006; Tann et al., 2007). In contrast, efforts to create culturally congruent development projects (such as local floral commodities, crafts, ecotourism and indigenous wild food products) can bolster economic development within underdeveloped natural areas while simultaneously maintaining their value as wilderness and preserving biodiversity (Colton, 2005; Emery, 1999; Vaughan, 2000).

Issues aside from economic concerns may also weigh into local decision-making on developing local berry resources as a commodity. Indigenous people across North America have cited a growing chasm between elders and tribal youth, who have increasingly adopted diet, clothing and cultural attitudes in closer alignment with a pro-Western worldview but are at odds with traditional values of respect, reciprocity and empowerment (Frideres, 1993; Greer, 1992; Story et al., 2000; Tsuji, 1996). Additionally, shifts from traditional to Western commodity diets have precipitated a dramatic rise in lifestyle-related diseases (such as obesity and Type 2 diabetes) (Acton et al., 2003; Burrows et al., 2001). However, creation of a new economic development project, which validates traditional beliefs about wild berry health benefits and unites generations in the harvest and processing, has the potential to strengthen the community. Tribal youth and elders working together on traditional lands fosters a renewed forum for communicating traditional ecological knowledge and traditions to successive generations (Colton, 2005). Also, culturally sensitive development projects are better positioned to succeed economically, while simultaneously addressing specific tribal goals (Middleton & Kusel, 2007). Unique economic and cultural opportunities for NA/AN communities can be advanced through promotion of a novel, financially viable market opportunity centred on traditional plants and activities.

In this article, we consider the ramifications for Alaska Native communities of developing wild Alaskan berries as a commercial enterprise. Strengths, weaknesses, opportunities and threats (SWOT) analysis is applied to better assess potential barriers and determine the practicality of commercialising this unique Alaskan berry resource.

Internal Strengths

The demonstrated health benefits of Alaskan berry resources are positive incentives for development of a new commercial product. The ‘super-fruits’ on the market today—cranberries, blueberries, pomegranates, tart cherries, açai berries, black currants, lingonberries, mangosteen, goji berries and others—are currently marketed on the basis of high levels of endogenous health-enhancing phytochemicals (Facenda, 2007). Some wild Alaskan berries contain up to 4.39 mg anthocyanins per gram fruit, greater than many super-fruits (Table 1). Additionally, wild Alaskan berries feature multiple anthocyanin aglycone structures along with proanthocyanidins, phenolic acids and other polyphenol compounds, creating a phytochemical cocktail potentially capable of providing greater biological protection in vivo (Grace et al., 2009; Lila & Raskin, 2005; Seeram & Heber, 2007).

Table 1. Anthocyanin Content of Selected Super-fruit Compared with Wild Alaskan Berries

Fruit	Anthocyanin Content mg/g fruit	Source
Açai	3.03	(de Rosso et al., 2008)
Blueberry	3.27	(Grace et al., 2009)
Cranberry	3.60	(Prior et al., 2001)
Lingonberry	1.74	(Andersen, 1985)
Alaskan Mossberry	4.39	(Kellogg et al., 2010)
Alaskan Blueberry	3.34	

Certain Alaskan berry species have recently demonstrated remarkable potential to offset aspects of metabolic syndrome; mossberry and blueberry lowered triglyceride accumulation in mature 3T3-L1 adipocytes up to 20 per cent, while salmonberry offset adipocyte generation by

upregulating *pref-1* expression 82 per cent over control levels. This translates into a strong potential to counteract obesity by preventing fat cell growth and triglyceride uptake in the cells. Furthermore, selected Alaskan berries lowered postprandial serum glucose levels by 26 to 45 per cent in an in vivo model, on the same magnitude of the anti-diabetic pharmaceutical Metformin® (Kellogg et al., 2010). The powerful and scientifically validated bioactivity demonstrated by Alaskan berries suggests that they could be strong contenders to compete with other super-fruits on the market today.

Successful marketing of wild berry commodities often relies on substantial laboratory evidence of health-promoting characteristics. Health and nutrition claims supported by laboratory or clinical science are powerful marketing tools which guide consumers' food decisions (Leathwood et al., 2007). Wansink et al. (2005) demonstrated that purchasing is more likely to occur when the consumer is fully aware of the *outcomes* (health benefits) of consumption, rather than just aware of the *content* of the food (Wansink et al., 2005). The açai berry gained significant attention in the European fruit juice sector, and subsequently in the United States, because of its scientifically proven nutritional profile and associated health benefits, and this experience could offer considerable insight on how to market new exotic berries and juices to the commercial marketplace (Sabbe et al., 2009).

Wild berries are distributed throughout Alaska, on both public and private land. Alaska Native tribes hold title to 44 million acres distributed throughout the state, about 10 per cent of the total land mass of Alaska (Alaska Department of Natural Resources, 2000). Tribal access to reserve land translates into a powerful supply advantage (Anderson & Parker, 2009) because of the property rights conferred regarding local natural resources. There is a synergy between economic development and strengthening land rights; as an advisor to Canada's Woodland Cree First Nation (WCFN) stated: 'By controlling commercial activities . . . the WCFN are in a better position to gain even greater control of their land' (Colton, 2005). The access to reserve land confers the potential to harvest berries across the state, allowing Alaska Native tribes to manage local resources independently.

Wild berry fruit that is exposed to natural environmental stress is likely to accumulate higher phytochemical content than cultivated

varieties, which translates into improved health benefits to consumers (Deighton et al., 2000). In addition, wild berry stands require no agriculture maintenance, which promises a cost benefit to the local tribal communities. In comparison, wild blueberries of New England are often treated as a semi-regulated agricultural product and are managed with minimal inputs, including weed management, herbicides, irrigation, pollination, fertilization and pruning, which increases yield of the crops (Yarborough, 2004). Wild blueberry production in Maine carries annual maintenance costs (i.e. not including harvesting or processing) between \$400 and \$500 per acre (DeGomez et al., 2001), whereas growing cultivated blueberries elsewhere (e.g. blueberry production in California's San Joaquin Valley) can cost \$1,395 per acre per year (Bervejillo et al., 2002). Removing any requirements for the physical upkeep of the crop dramatically reduces the overhead costs of production. In the case of Alaskan berries, it is not clear whether agricultural inputs could even improve on the abundance of the arctic crop. Mossberries increased vegetative growth in response to nitrogen and phosphorus fertilisations, however no correlation with fruit production was determined (Holloway, 2006), and the necessity of subsurface fertiliser application (due to permafrost) for the Alaska berries would be cost-prohibitive. Maintaining Alaskan berries in their native wild stands is not only a financially effective production regime, but is also likely to be the best strategy to preserve the unique health-protective composition of the berry fruits.

Internal Weaknesses

Potential negative consequences of commercialisation must also be considered, as Alaskan berries risk exploitation and degradation if they came to be viewed as short-term profit generators rather than valued tribal resources. Alaska Native communities do not generally regard subsistence products as private resources, but rather as community assets. Resources such as berries have social and cultural importance beyond their function as a food stuff (Parlee et al., 2005). Consequently, there are complex rules interrelating ecological conditions, harvesting practices, resource access and harvest sharing within the tribe (Ostrom, 1990; Parlee et al., 2006). A prime example is the Yakutat village in the Gulf of Alaska,

where wildlife resources such as moose were harvested by small percentages of households (<25 per cent) but shared with more than 90 per cent of the community (Mills & Firman, 1986). The act of sharing resources is a complex process, often containing social, moral and religious implications and reinforcing communal relationships between community members. This can imbue the commodity with significance beyond mere economic trade (Langton et al., 2006). These attitudes apply to berries as well; the Gwich'in in northern Canada frequently share their harvest within the village but would not consider selling their berries for economic gain (Parlee et al., 2005). Thus, there often is an inherent disconnect between the traditional uses of subsistence products and potential development of a commodity saleable external resource.

In some cases, coordinated efforts by multiple NA/AN nations have culminated in successful approaches that have integrated local concerns and perspectives into comprehensive natural resource management programmes. The Columbia River Inter-Tribal Fish Commission (CRITFC) uses consensus-based decision-making to balance the cultural and material needs of each member, and to establish a cohesive policy position for regulation of water and salmon fishing policy in the Pacific Northwest (Cronin & Ostergren, 2007). In the case of wild berries, while a balance could be struck between subsistence needs and economic development, undoubtedly a portion of Alaska Native tribes would be against such development and decline participation in any venture to commercialise.

A berry production scheme regulated by tribal communities and maintained as a communal resource could provide a buffer against the threat of over-harvesting. The community-run enterprise could use cultural guidelines to regulate harvest and to set specific harvest quotas. Communal resource management has been shown to discourage over-extraction and poaching by both natives and non-natives (Ballard et al., 2002), to help prevent cases like that encountered by the Ktunaxa—an indigenous people in the Pacific Northwest. In this case, non-native harvesters trespassed on traditional land to collect huckleberries for commercial export, and the harvesting activity went unchecked until the huckleberry bushes were decimated by over-harvest, leading to subsistence shortages for the Ktunaxa and widespread ecological damage (Turner, 2001).

Tribal corporations have recently been introduced into Alaska Native communities, which may introduce a level of complication into the process of communal decision-making. Twelve regional native corporations were organised under the Alaska Native Claims Settlement Act (ANCSA) of 1972, designed for pro-profit tribal economic development (ANCSA Network, 2009). The pre-existing political structures were organised along traditional concepts of communal property and consensus-based policy. The native corporations, designed around independent income generation for the tribes without government oversight and control, were implemented on top of the political structures. This bifurcated the governing of tribal development, as the traditional political organisation of the tribes no longer held title to the land (Berardi, 1998).

The resulting dichotomy precipitated disputes between regional corporations and tribal members over extraction of resources and development. As one example, timber rights sold by a corporation were viewed by some community members as disrupting subsistence resources and damaging the local ecosystem (Bristol, 1996). The ultimate structure of these corporations, and their role in directing Alaska Native subsistence economies, is still evolving to determine an optimal balance (Thornton, 2007). Some communities could perceive the commercialisation of wild berries as an undesired avenue of economic development forced upon them by the corporations, ultimately leading to more environmental degradation and compromising the traditional values of the resources; other communities or community members may hold opposite viewpoints. It is essential that the entire tribal community be involved in deciding whether to produce berries as a commodity, and that consensus is achieved before moving forward with such a development project.

Erratic availability of local harvesters and unpredictable fruit production levels are additional internal weaknesses that could undermine commercialisation efforts. Indigenous individuals may sell subsistence products to supplement their income, but it is not typically a full-time occupation (Emery, 2002). Denali BioTechnologies, a non-native commercial supplement company located in Alaska, had to investigate the option of hiring harvest crews from the lower 48 United States to supplement local harvesters, as the labour supply from local communities was viewed to be fluctuating and a possible production obstacle (Bauman, 2005). For a tribally owned commercial enterprise, such outsourcing

may not be viewed as a tenable solution to labour needs. Maintaining the berries as a wild crop exposes them to the Alaskan environment, and berry development can fluctuate wildly year-over-year because of variations in local climate, including seasonal temperatures and precipitation. The mossberry is the most reliable of the Alaskan berries in producing year-to-year yields (Holloway, 2006), and considering the range of berries in Alaska, it is conceivable that decreases in one region could be offset by increases elsewhere, keeping the overall harvest levels stable.

As a comparison, costs associated with harvesting commercial wild blueberries in Maine and Canada represent the greatest annual input for crop production, yet are highly variable. Producers may bear costs of \$900 to \$2,300 an acre by raking (DeGomez et al., 2001), or by hand-picking, respectively (Bervejillo et al., 2002). Alaska Native tribes managing the harvesting process could potentially negotiate individual harvest cost structures. The Alaska Tribal Cache, a berry-based enterprise operated by the Seldovia tribe, uses a voluntary harvest model where individuals are paid according to the volume collected, as opposed to hourly rates. In 2009, the Cache paid \$4 per pound for blueberries and \$2.50 per pound for salmonberries, which factors into the wholesale price for the berries. In addition, if the Alaskan berries were developed as a commodity, these berries would need to be transported from geographically isolated harvest sites to large processing facilities, which would incur both transport costs as well as potential post-harvest losses from spoilage and physical damage.

External Opportunities

The American consumer is increasingly in tune with the benefits of functional, health protective foods, which has created escalating sales potential for super-fruits that can be backed by credible, science-based evidence. Marketing wild Alaskan berries, as a start-up business with limited initial resources, could potentially benefit from pathways that other super-fruits (e.g. açai berry) have successfully utilised to gain entry into the marketplace. This strategy could include direct positioning as a super-food, which is aligned to consumers' growing health-consciousness. According to a report by Datamonitor, the super-food

market—defined as foods that are rich in ‘specific nutrients and phytochemicals (i.e. antioxidants) and are promoted as being able to improve health condition and/or disease prevention’—is expected to double in the US and Europe from the years 2001–2011 (Datamonitor, 2007). Sales of the top three super-fruit—açai, pomegranate and goji berry—experienced year-over-year sales exceeding 140 per cent from 2006 to 2007 (Table 2), with açai nearly tripling 2006 sales receipts to \$29.3 million (Anonymous, 2007).

Table 2. Sales from Three Super-fruit-based Products: Açai, Pomegranate, and Goji Berry

Super-fruit	2007 Sales (USD)	2006 Sales (USD)	Per cent Change
Açai	\$29,331,200	\$9,878,068	+ 197
Pomegranate	\$23,120,946	\$9,223,004	+ 151
Goji Berry	\$9,611,345	\$3,906,986	+ 146

Source: From Anonymous (2007).

Also contributing to this market expansion is the ubiquity of food products that can feature super-fruits. In 2003, 50 super-fruit-themed pomegranate products hit the market. Since then pomegranate has become a mainstream super-fruit, and by 2007 over 400 unique products contained pomegranate (Aranowski, 2009). Super-fruits have become ingrained in nearly every major food category, including baby food, confectioneries, even pet food (Facenda, 2007). Manufacturers are continually developing novel ways of incorporating fruit into food products; Ocean Spray has developed a line of super-fruit fusions, for use in baking applications (Rigik, 2009), and Jelly Belly recently announced a new line of jellybeans named the Super-fruit Mix, which includes açai berry, Barbados cherry, cranberry, blueberry and pomegranate (Anonymous, 2009). Beverages are the largest segment of new super-fruit product development and super-fruits have attracted interest from a number of companies, with Minute Maid, Tropicana, Apple & Eve, Blue Bunny, POM and Anheuser-Busch, all releasing products that are marketed based on super-fruit content (Anonymous, 2007).

Marketing exoticism plays to the imagination of the consumer, evoking images of pristine, far-away places. Hawaii has embraced exoticism as a marketing mechanism to develop a niche agricultural market for its

sugarcane and pineapple crops in the face of increasing global competition (Suryanata, 2000). Alaska has a wild, unspoilt character, which is ingrained on the collective psyche for decades (the state's nickname is 'The Last Frontier'), and has been utilised effectively by the state to promote tourism, and by Alaska Natives in marketing other cultural pieces, namely art and crafts (Moore, 2008). Wild berry-derived products (jams, syrups, etc.) and other wild plant products are made by the Alaska Tribal Cache of the Seldovia Village Tribe. This small-scale enterprise does market, to an extent, based on exoticism, with slogans like, 'On the sunny slopes above pristine Seldovia Bay, in Alaska's south-central region, grow the wildest of the wild berries. Nourished by clean winter snows, fresh spring rains and the long sunshine filled days of Alaska's summer, Seldovia's wild berries become a natural treasure' (Alaska Tribal Cache, 2009).

There is an ongoing hunt for new fruits and botanicals to widen the super-fruit arena. This trend is a reflection of evolving consumer preferences and scientific research, which has subsequently been translated into the popular press. Ethnic and traditionally used products are gaining more popularity in the super-fruit category, leading to the inclusion of noni, Cat's claw and baobab as the newest super-fruit entries to hit super-market shelves (Aranowski, 2009; Gruenwald, 2009). Researchers are recognising the importance of indigenous peoples' traditional knowledge in identifying novel super-fruits, utilising subsistence foods and medicinal plants with potentially powerful health properties as super-fruit candidates (Netzel et al., 2007). The status of Alaskan wild berries as a tribal resource, backed by traditional ecological knowledge (TEK) and a long history of human use, could translate into strong appeal in the marketplace. Finally, Alaskan berries are domestically produced (have 'buy-American' market appeal), yet still evoke an image of exoticism and mystique due to their distant, extreme Arctic origin.

Federal and state governmental programmes could assist Alaska Native communities in structuring a development plan for a commercial wild berry product. The federal government has advisory programmes available to NA/AN tribes, specifically designed to help adapt indigenous commodities to the marketplace. The United States Department of Agriculture (USDA) has partnered with the Intertribal Bison Cooperative (ITBC) to develop production and market strategies for traditionally

maintained bison herds (Schofer, 2008), using business tools to exploit the best methods possible for introducing bison products into the marketplace. Government projects involving environmental protection and research are another potential target for partnership. Alaska Native tribes possess a strong sense of stewardship towards the land, because land has cultural and spiritual significance and provides a source of physical subsistence (Whiting, 2004). Given this strong connection with the land, Alaska Native tribal communities may coordinate with government programmes to promote sustainable land use and develop land-based commercial activities that protect biodiversity (Watson et al., 2003). For example, the Northwest Research and Harvester Association, which assists floral greens producers in the Pacific Northwest, enacted an agreement with the State of Washington Department of Natural Resources and Washington State University to manage the floral greens and understory species in several state forests. This aided the government against unauthorised harvesting (poaching) and maintained sustainable harvesting measures while ensuring the harvesters had access to large tracts of land (Ballard et al., 2002).

External Threats

Alaska Native harvesters, as small-scale agriculture producers, may have limited control or understanding of prices and labour regulations, quality control and standardisation requirements (Gulati et al., 2007). Small producers are chronically excluded from management decisions, leaving them without a voice in the market and exacerbating their economic disadvantage (Ballard et al., 2002; Dubey, 2007). As a result, aboriginal producers are more likely to divest themselves from a controlling interest in market structures and rely on non-native businesspersons to conduct operations (Cleary et al., 2008). Despite this disparity in power, small producers are integral to many areas of national and global agriculture; over 70 per cent of the milk produced in India is generated by households with only one or two animals, which are linked together by a nationwide cooperative network of dairies (FAO, 2004). Collective agricultural organisations are able to provide members with essential assistance by

strengthening the role of small agricultural producers (Hellin et al., 2009). These associations are able to utilise economies of scale from aggregating the interests of multiple small producers, empowering them to engage larger marketplaces, negotiate more equitable price contracts and compete fairly in a global economy (Stockbridge et al., 2003).

NA/AN organisations have managed shared resources effectively in the past by engaging with external agencies and entities. The Arctic's Yukon River, stretching from the Canadian Yukon through Alaska, is home of the largest salmon run in the world. Ecological degradation prompted the formation of the Yukon River Inter-Tribal Watershed Council (YRITWC), to better manage the protection of the river and its resources. Now encompassing 65 distinct tribes and First Nations, the YRITWC has capitalised on the power of collective effort in interacting with external forces. Peter Captain Sr., a former YRITWC chairman, noted that 'The communities each had to speak for themselves . . . Before, we couldn't articulate our voices with force. Now with the council, we have the force of many voices' (quoted in Record, 2008). The CRITFC has also leveraged the abilities and resources of each member tribe to develop a larger sphere of influence, a demonstration of 'politics of scale' to establish strength in working with external agencies (Record, 2008).

Consumer taste patterns are governed by a wide variety of socio-economic stimuli, which result in a large number of short-term food fads that rise in popularity and then decrease precipitously. This is partially attributed to species survival psychology; humans possess multiple biological and psychological mechanisms that promote variety in the diet and can cause our tastes to wander, such as sensory-specific satiety, in which there is a marked decrease in desire for a specific food following consumption (Lyman, 1988). The United States has a long history of food fads, many of which have long faded from prominence (Lovegren, 2005). Industry publications monitor such trends, attempting to predict future shifts in consumer preference and taste (Aranowski, 2009). As super-fruits are a relatively new industry, there is little indication of whether the popularity of super-fruit is a limited consumer fad or a more permanent shift in consumption patterns. Of course, declines in shopper preference for super-fruits would have a negative effect on the continued viability of any wild Alaskan berry commodity.

As discussed earlier, the Alaskan berries are heavily reliant on seasonal temperature and precipitation for proper development and maturation of the fruit. Disruptions to berry growth would be a significant supply concern for any commercial Alaska berry commodity, and thus concerns over climate change represent a large external threat to wild berries. Alaska's unique environmental position has made it especially vulnerable to the effects of shifting climate, with Arctic temperatures increasing substantially over the last three decades (Serreze et al., 2000; Simpson et al., 2002). This has triggered a prolonged growing season for Arctic plants and an upsurge in vascular vegetation by as much as 20 per cent (Sturm et al., 2001). A shorter and warmer winter, as predicted by the Scenario Network for Alaska Planning (SNAP, 2009), could prove severely detrimental to the berry crop, as many species require overwintering to produce fertile flowers and fruit (Wendell & Alsanius, 2008). However, the ultimate effects of climate change on the berries, and thus the berry commodity, are unclear now. Prolonged growing seasons could allow wider ranges for berry production, but competing species are then also more likely to encroach on the growing areas. In addition, the unique bioactive berry phytochemical profiles typically provoked by the hostile environments in Alaska are likely to be attenuated, since the plants will have less need to synthesise protective compounds as climates are moderated. Decreases in polyphenols would lower the fruits' bioactive content average, and consequently decrease its attractiveness as a healthful dietary commodity.

Prospects for Start-up Financing and Marketing

Commercialising Alaska tribal berries as a super-fruit would require considerable financial resources to manage harvesting, channel partner distribution and implement marketing and branding. There are many options when considering the capitalisation of a new business venture, which can range from traditional debt financing to more 'hands-on' venture philanthropy. In the specific case of wild berry resources on Alaska Native lands, there is an additional consideration in that any commercialisation would require full endorsement of the associated tribal council(s) and their guidance on how financial arrangements would

ultimately benefit the community. It may in fact be difficult to identify a single representative or entity that would be able to speak on behalf of the tribal community to set up the terms of capitalisation.

The Small Business Innovation Research (SBIR) programme is a \$2-billion federal funding source originally created to provide funding for small and disadvantaged business sectors in exchange for assistance in meeting research and development needs of 11 federal agencies (Wessner, 2008). The USDA's SBIR programme may represent a potential funding source to commercialise wild berries on native lands in Alaska as within the programme, the section of Economic & Community Development assists developers to

promote increased prosperity and economic security for individuals and families, farmers and ranchers, entrepreneurs, and consumers across the nation. Working together with land-grant university partners and a host of public and private collaborators, EC staff provide national leadership for research, education, and extension activities that help people incorporate sound financial management strategies in their daily lives, discover new economic opportunities, develop successful agricultural and nonagricultural enterprises, take advantage of new and consumer-driven markets at both the local and international levels, and understand the implications of public policy on these and other activities (USDA, 2004).

USDA SBIR solicitations include requests for novel ways to develop specialty crops and genomic tools that assist with the development of new commercial agricultural products. However, because of the technical nature of SBIR proposals, Alaska Native communities might benefit from guidance in the proposal development. One potential model would link the Alaska Native communities with university partners, who frequently take on commercialisation projects as a component of federal and foundational research and development research grants. These partnerships could provide additional expertise and leverage to help the small-scale community enterprise reach broader financing opportunities.

Other possible funding candidate sources of funds for the tribal communities are loan products from a Community Development Financial Institute (CDFI). Several barriers complicate the ability of many mainstream lenders to serve tribal populations, including underdeveloped

commercial tribal law, slow government operations and decision-making, lack of collateral, limited financial and physical infrastructure and cultural barriers (Carr, 2006). However, because of their more specialised nature, CDFIs possess characteristics that allow them to uniquely address many of these hurdles.

CDFIs are funding sources affiliated with the US Treasury Department. These institutes are designed to provide services beyond simple funding, including start-up technical assistance, to underserved businesses and organisations engaged ameliorating poverty and reviving distressed communities in the United States. According to the 2006 CDFI Data Project, CDFI programmes are effective in reaching clients that typical banks overlook, especially low-income families, minorities and women, which represent 70 per cent, 58 per cent and 51 per cent of their client base, respectively. For the 2006 fiscal year, the CDFI reports financing and assisting over 8,100 businesses, which in turn created or maintained 35,609 jobs (Opportunity Finance Network, 2007). CDFIs have been lauded as effective lending tools due to locally hired staff and board leadership, which imbues the association with a higher degree of cultural respect (Carr, 2006). Economic development strategies and tools that are controlled on a local basis are integral to reaching the mission of the CDFI, as the failures of externally derived economic development systems and models have become apparent over the last 20 years (Deweese & Sarkozy-Banoczy, 2008). For Alaska Native communities attempting to commercialise native berries, CDFIs represent a promising potential source of funding.

As noted earlier, Alaska wild berries may be well positioned for entry in the super-fruit category. An apropos marketing strategy could pursue partnerships with niche retailers (e.g. Trader Joe and Whole Foods) that consumers perceive to be aligned with healthy, natural foods. Consumer decision-making processes regarding new fruits are based on a sophisticated mix of personal characteristics (e.g. age, educational status and health preservation behaviours), environmental factors and food properties (Kamphuis et al., 2006; Krystallis et al., 2008), and consumers more likely to purchase novel fruit products are categorised as urban, highly educated individuals with disposable income (Diop & Jaffee, 2005). In general, this demographic typically purchases a higher proportion of produce from independent stores, niche retailers or farmers'

market, as opposed to traditional grocers or supermarkets (Uva & Weybright, 2005), thus making potential associations with niche retailers a vital component of any marketing strategy.

Conclusion

Wild Alaskan berries form an integral part of Alaska Native traditional ecological knowledge and subsistence lifestyle. The super-fruit agricultural industry has demonstrated the marketability of exotic, nutrient-rich fruit as a viable commodity and has provided a potential opening for wild Alaskan berries to emerge as a niche produce in the marketplace. However, careful consideration of the opportunities and challenges is essential before approaching such an enterprise, and this analysis has provided insight into some of the most critical aspects of development.

There are several positive factors for a commercial enterprise by the Alaska Native tribes, notably the remarkable bioactive potency of the berries, facile access to their natural habitat, and reduced need for production and harvesting inputs. The tribes could benefit from government partnerships that assist in developing marketing strategies and business opportunities. However, cultural perceptions of Alaska berries, and their prominent position in native lifestyle, could heighten latent fears of a further disconnect from that tradition. In addition, other obstacles facing the tribes related to commercialisation of a wild berry product relate to the source of initial financing for the business and the absence of current logistical cost data, which could be substantial considering the remoteness of some Alaska Native communities. Shifting consumer preferences and the ever-looming spectre of climate change also pose concerns for an Alaska berry commodity.

While a wild berry commodity could be instrumental in arresting the chronic underdevelopment experienced by Alaska Native tribes and could contribute to the continued propagation of traditional culture and values to successive generations, the possibility of commercialising a novel super-fruit product would require a strategic balance between the tribes and the marketplace, extraction and preservation of resources, traditional activities and modern business practices and more investigation into the interplay of these various factors is required.

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